

WHAT IS CLAIMED IS:

1           1.       A method for performing an Input/Output (I/O) operation with respect  
2 to a logical device capable of being accessed by multiple host systems, comprising:  
3           overwriting metadata in the logical device that is required in order to access  
4 the data in the logical device to prevent at least one host system from accessing the  
5 data in the logical device represented by the overwritten metadata;  
6           performing an I/O operation with respect to the logical device; and  
7           writing valid metadata to the logical device to enable host systems to access  
8 the data in the logical device represented by the metadata.

1           2.       The method of claim 1, wherein the metadata is written to the logical  
2 device after performing the I/O operation.

1           3.       The method of claim 1, wherein the metadata overwritten comprises  
2 file system metadata.

1           4.       The method of claim 1, further comprising:  
2           before overwriting the metadata, copying the metadata to a local memory,  
3 wherein writing the metadata to the logical device after performing the I/O operation  
4 comprises copying the metadata from the local memory to the logical device.

1           5.       The method of claim 4, further comprising:  
2           modifying the metadata in the local memory when performing the I/O  
3 operation, wherein the valid metadata written to the logical device comprises the  
4 modified metadata.

1           6.       The method of claim 4, wherein the overwritten and copied metadata  
2 comprises sufficient metadata for the logical device to prevent at least one host  
3 system from accessing any data in the logical device.

1           7.     The method of claim 4, wherein the overwritten and copied metadata  
2 comprises a portion of the metadata for the logical device, wherein the portion of the  
3 metadata corresponds to data in the logical device that is subject to the I/O operation,  
4 wherein overwriting the portion of the metadata prevents at least one host system  
5 from accessing the data that is subject to the I/O operation, and wherein at least one  
6 host can access data in the logical device during the I/O operation corresponding to  
7 metadata that is not the portion of the overwritten metadata.

1           8.     The method of claim 1, wherein the I/O operation comprises an  
2 operation to restore an image to the logical device from a backup storage device.

1           9.     The method of claim 8, further comprising:  
2 restoring the metadata to the logical device from the backup storage device;  
3 buffering the restored metadata before overwriting the restored metadata on  
4 the logical device; and  
5 restoring the image to the logical device from the backup storage device,  
6 wherein writing the valid metadata to the logical device comprises writing the  
7 buffered restored metadata to the logical device.

1           10.    The method of claim 8, wherein both the logical device and backup  
2 storage device are coupled to a network, wherein the image to restore is copied from  
3 the storage device to the logical device over the network.

1           11.    The method of claim 8, wherein a data mover coupled to the network  
2 copies the restore image from the backup storage device to the logical device over the  
1 network, wherein a storage client and storage server are separately coupled to the  
1 network, and wherein the network to which the logical device and the backup storage  
2 device are coupled comprises a first network, further comprising:

3           communicating from the storage client a request to the storage server to  
4   restore the image to the logical device over a second network, wherein the storage  
5   server causes the data mover to copy the restore image from the backup storage  
6   device to the logical device in response to the request from the storage client.

1           12.    A system for performing an Input/Output (I/O) operation, comprising:  
2           a plurality of host systems;  
3           a logical device;  
4           a network, wherein the host systems and logical device are in data  
5   communication over the network;  
6           a program executed by one host system to perform operations comprising:  
7                (i) overwriting metadata in the logical device that is required in order  
8           to access the data in the logical device to prevent at least one host system  
9           from accessing the data in the logical device represented by the overwritten  
10          metadata;  
11               (ii) performing an I/O operation with respect to the logical device; and  
12               (iii) writing valid metadata to the logical device to enable host systems  
13          to access the data in the logical device represented by the metadata.

1           13.    The system of claim 12, wherein the metadata is written to the logical  
2   device after performing the I/O operation.

1           14.    The system of claim 12, wherein the metadata overwritten comprises  
2   file system metadata.

1           15.    The system of claim 12, wherein the operations performed by the  
2   program further comprise:

3 before overwriting the metadata, copying the metadata to a local memory,  
4 wherein writing the metadata to the logical device after performing the I/O operation  
5 comprises copying the metadata from the local memory to the logical device.

1 16. The system of claim 15, wherein the operations performed by the  
2 program further comprise:  
3 modifying the metadata in the local memory when performing the I/O  
4 operation, wherein the valid metadata written to the logical device comprises the  
5 modified metadata.

1 17. The system of claim 15, wherein the overwritten and copied metadata  
2 comprises sufficient metadata for the logical device to prevent at least one host  
3 system from accessing any data in the logical device.

1 18. The system of claim 15, wherein the overwritten and copied metadata  
2 comprises a portion of the metadata for the logical device, wherein the portion of the  
3 metadata corresponds to data in the logical device that is subject to the I/O operation,  
4 wherein overwriting the portion of the metadata prevents at least one host system  
5 from accessing the data that is subject to the I/O operation, and wherein at least one  
6 host can access data in the logical device during the I/O operation corresponding to  
7 metadata that is not the portion of the overwritten metadata.

1 19. The system of claim 12, further comprising:  
2 a backup storage device coupled to the network, wherein the I/O operation  
3 comprises an operation to restore an image to the logical device from the backup  
4 storage device.

1 20. The system of claim 19, wherein the operations performed by the  
2 program further comprise:

3 restoring the metadata to the logical device from the backup storage device;  
4 buffering the restored metadata before overwriting the restored metadata on  
5 the logical device; and  
6 restoring the image to the logical device from the backup storage device,  
7 wherein writing the valid metadata to the logical device comprises writing the  
8 buffered restored metadata to the logical device.

1 21. The system of claim 19, wherein both the logical device and backup  
2 storage device are coupled to a network, wherein the image to restore is copied from  
3 the storage device to the logical device over the network.

1 22. The system of claim 19, further comprising:  
2 a data mover coupled to the network, wherein the data mover copies the  
3 restore image from the backup storage device to the logical device over the network;  
4 a storage client coupled to the network;  
5 a storage server coupled to the network, wherein the network to which the  
6 logical device and the backup storage device are coupled comprises a first network;  
7 wherein the operations performed by the program further comprise  
8 communicating from the storage client a request to the storage server to restore the  
9 image to the logical device over a second network, wherein the storage server causes  
10 the data mover to copy the restore image from the backup storage device to the  
11 logical device in response to the request from the storage client.

1 23. An article of manufacture for performing an Input/Output (I/O)  
2 operation with respect to a logical device capable of being accessed by multiple host  
3 systems, wherein the article of manufacture causes operations to be performed, the  
4 operations comprising:

5           overwriting metadata in the logical device that is required in order to access  
6   the data in the logical device to prevent at least one host system from accessing the  
7   data in the logical device represented by the overwritten metadata;  
8           performing an I/O operation with respect to the logical device; and  
9           writing valid metadata to the logical device to enable host systems to access  
10   the data in the logical device represented by the metadata.

1           24.    The article of manufacture of claim 23, wherein the metadata is  
2   written to the logical device after performing the I/O operation.

1           25.    The article of manufacture of claim 23, wherein the metadata  
2   overwritten comprises file system metadata.

1           26.    The article of manufacture of claim 23, wherein the operations further  
2   comprise:  
3           before overwriting the metadata, copying the metadata to a local memory,  
4   wherein writing the metadata to the logical device after performing the I/O operation  
5   comprises copying the metadata from the local memory to the logical device.

1           27.    The article of manufacture of claim 26, wherein the operations further  
2   comprise:  
3           modifying the metadata in the local memory when performing the I/O  
4   operation, wherein the valid metadata written to the logical device comprises the  
5   modified metadata.

1           28.    The article of manufacture of claim 26, wherein the overwritten and  
2   copied metadata comprises sufficient metadata for the logical device to prevent at  
3   least one host system from accessing any data in the logical device.

1           29.    The article of manufacture of claim 26, wherein the overwritten and  
2    copied metadata comprises a portion of the metadata for the logical device, wherein  
3    the portion of the metadata corresponds to data in the logical device that is subject to  
4    the I/O operation, wherein overwriting the portion of the metadata prevents at least  
5    one host system from accessing the data that is subject to the I/O operation, and  
6    wherein at least one host can access data in the logical device during the I/O  
7    operation corresponding to metadata that is not the portion of the overwritten  
8    metadata.

1           30.    The article of manufacture of claim 23, wherein the I/O operation  
2    comprises an operation to restore an image to the logical device from a backup  
3    storage device.

1           31.    The article of manufacture of claim 30, wherein the operations  
2    comprise:  
3           restoring the metadata to the logical device from the backup storage device;  
4           buffering the restored metadata before overwriting the restored metadata on  
5    the logical device; and  
6           restoring the image to the logical device from the backup storage device,  
7    wherein writing the valid metadata to the logical device comprises writing the  
8    buffered restored metadata to the logical device.

1           32.    The article of manufacture of claim 30, wherein both the logical  
2    device and backup storage device are coupled to a network, wherein the image to  
3    restore is copied from the storage device to the logical device over the network.

1           33.    The article of manufacture of claim 30, wherein a data mover coupled  
2    to the network copies the restore image from the backup storage device to the logical  
1    device over the network, wherein a storage client and storage server are separately

1 coupled to the network, and wherein the network to which the logical device and the  
2 backup storage device are coupled comprises a first network, further comprising:  
3 communicating from the storage client a request to the storage server to  
4 restore the image to the logical device over a second network, wherein the storage  
5 server causes the data mover to copy the restore image from the backup storage  
6 device to the logical device in response to the request from the storage client.